Fig. 1. Video image showing another aircraft flying in the field of view of the camera mounted on the Boeing 737.

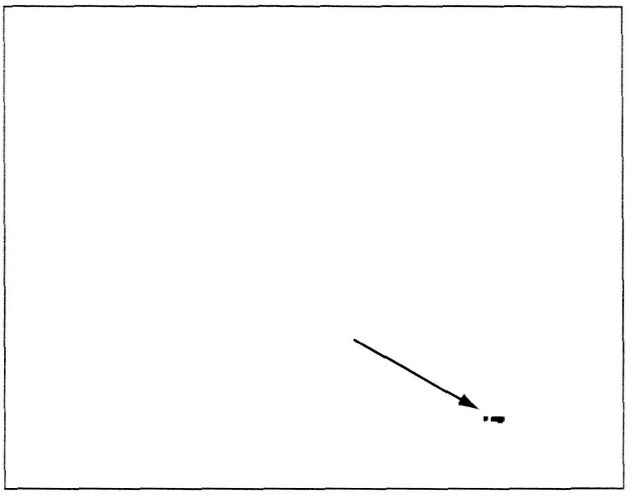

Fig. 2. Results of the computer program. The black region indicates the position of the aircraft in figure 1.

right to left across the path of the Boeing 737, producing the image in the first figure. The position of the target plane is indicated by the arrow in the figure. In this instance, the target plane was a Beech King Air 200 flying at a distance of 1 nautical mile from the Boeing 737. At this distance, it appears relatively small in the image. A computer program based on an optical flow algorithm located the aircraft, as shown in the second figure. In this latter figure, the area corresponding to the aircraft is shown in black.

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Surface Operations Research and Evaluation Vehicle

Mary K. Kaiser

The new research vehicle sited at Moses Lake Airport in central Washington doesn't look like it has much in common with the conceptual drawings for the next-generation supersonic airliner, the High-Speed Civil Transport (HSCT). In fact, the Surface Operations Research and Evaluation Vehicle (SOREV) bears more passing resemblance to the large, wheeled irrigators used in the wheat fields surrounding the airport than it does to the sleek, delta-winged HSCT that will one day fly the Pacific Rim at over twice the speed of sound. Yet to researchers addressing issues associated with HSCT taxi operations, the SOREV is a thing of beauty.

The SOREV (shown in the figure) accurately captures the gear and flight-deck geometry of the full-scale HSCT. On the HSCT, there will be an unusually large distance between the flight deck and the nose gear (the pilot sits over 50 feet in front of the gear), and the SOREV provides test capabilities not available in existing test vehicles. Further, the SOREV permits researchers to investigate a number of issues and options associated with the development of an eXternal Visibility System (XVS), which replaces conventional forward-facing windows with synthetic displays. Like the HSCT, the SOREV is equipped with

side windows, and the structure supports the mounting of cameras and other sensors.

The SOREV is fully equipped as an experimental vehicle, with extensive onboard position tracking and data collection facilities. Onboard monitoring systems also provide for vehicle safety; both they and the safety driver (who has a bubble-top view of the test arena) can perform safety shutdowns if performance envelopes are pushed too far.

The SOREV will play a significant role in ensuring that the HSCT can perform safely and that it will integrate seamlessly into the airport operations of the 21st century. The test vehicle was built by Martinez & Turek of Rialto, California, under a contract with Boeing, one of the industry partners of the NASA High-Speed Research Program. The other SOREV team partners are Honeywell and the NASA Ames and Langley Research Centers.

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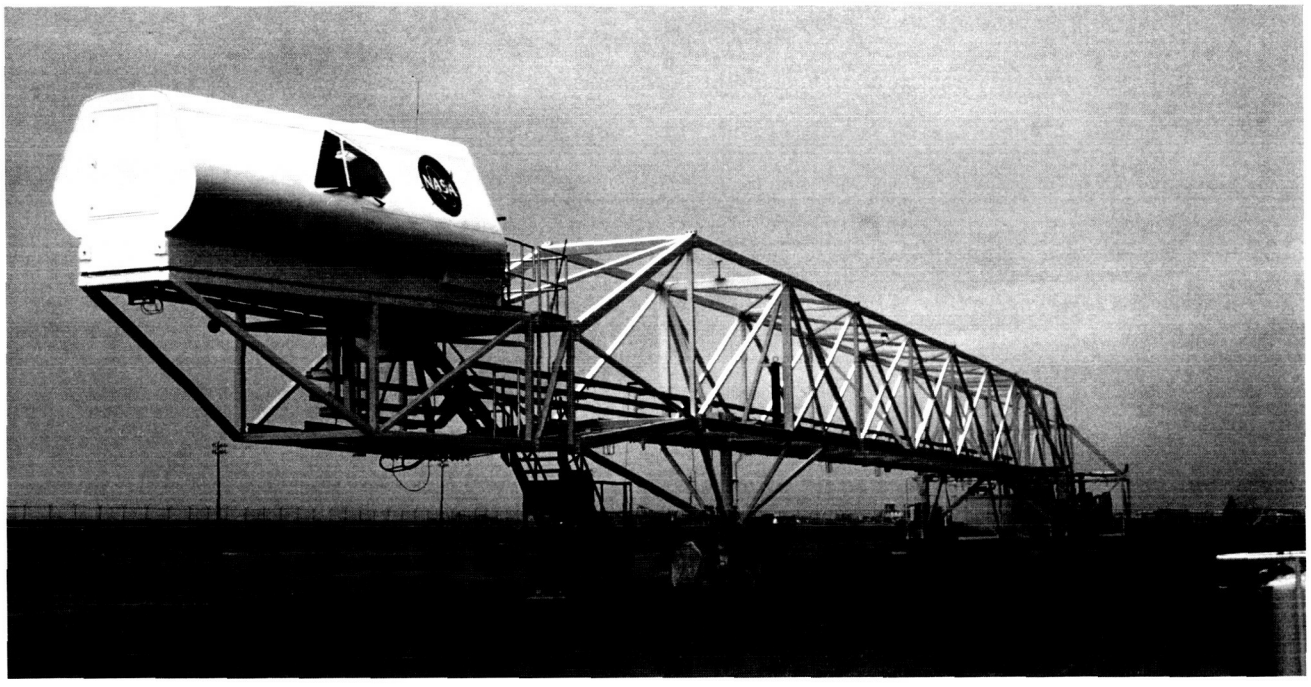

Fig. 1. The Surface Operations Research and Evaluation Vehicle (SOREV). This experimental vehicle accurately models critical aspects of the high-speed civil transport's geometry (e.g., gear and flight-deck placement) and ground maneuvering dynamics (acceleration, braking, turn capabilities).